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EXAMINER

VERDIER, CHRISTOPHER M

ART UNIT PAPER NUMBER

3745

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/774,399

Applicant(s)

LAGRANGE ET AL.

Examiner

Christopher Verdier

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2-10-04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Specification

The disclosure is objected to because of the following informalities: Appropriate correction is required.

Paragraph 12, which contains an initialed change in line 5, should be submitted as a replacement paragraph.

In paragraph 37, line 6, -- an -- should be inserted after “maintaining”.

In paragraph 46, lines 4 and 6, “equals” should be changed to -- equal --.

In paragraph 53, line 3, “,” should be deleted.

In paragraph 55, line 5, “radii” should be changed to -- radius --.

Paragraphs 66, 67, and 68, which contain initialed changes, should be submitted as replacement paragraphs.

In paragraph 67, line 7, “contain” should be changed to -- contains --.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 26 recites that a radius of curvature is .1492 inches. There is no antecedent basis for this limitation in the specification. (Perhaps the radius of .1492 inches is a typographical error and should actually refer to .1992 inches).

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Claim Objections

Claims 7-8, 18-19, 26-27, and 29-40 are objected to because of the following informalities: Appropriate correction is required.

In claims 7-8, 18-19, and 26-27, line 2, "radius" should be changed to -- radii --.

In claim 29, line 5, -- said -- should be inserted after "in".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 1, line 4, "each one" is indefinite, because it is unclear if this refers to the broach slots or the wheelpost.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 10-13, 21, 25, and 29-30 are rejected under 35 U.S.C. 102(b) as being anticipated by United Kingdom Patent 677,142 (figures 1-2). Note the turbine comprising an unnumbered

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wheel (the rotor disc) having plural unnumbered broach slots (which complement the firtree shape of the blade roots 1), each having an unnumbered interleaved system of fillets and tangs (which complement the firtree shape of the blade roots 1), plural unnumbered buckets each having a corresponding interleaved system of unnumbered fillets and tangs 4 so that the plural buckets can be fitted, one to one, into the plural broach slots on the wheel, with the interleaved system of fillets and tangs on the buckets and unnumbered wheelposts inherently acting to reduce stresses acting on the fitted buckets and wheelposts (due to the firtree shape), the fillets and tangs of the interleaved system of fillets and tangs each being formed by a combination of curved and straight surfaces, with the fillets formed on the plural buckets and the fillets formed on the plural wheelposts having angles of 55 degrees. There may be three interleaved tangs. Each of the wheelposts includes two unnumbered straight surfaces (which complement the firtree shape of the blade roots 1).

Claims 10-17, 21-25, and 29-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Goodwin 4,260,331. Note the turbine comprising a wheel 15 (the rotor disc) having plural unnumbered wheelposts (near 15 in figure 2 and located between adjacent slots 17), each having an interleaved system of unnumbered fillets and tangs (corresponding to the fillets 32 of the blade roots 18 and tangs 22 of the blade roots 18), and plural buckets 16 each having a corresponding interleaved system of fillets 32 and tangs 22 so that the plural buckets can be fitted, one to one, into the plural wheelposts, with the interleaved system of fillets and tangs on the buckets and wheelposts inherently acting to reduce stresses acting on the fitted buckets and wheelposts (due to the firtree shape), the fillets and tangs of the interleaved system of fillets and

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tangs each being formed by a combination of curved and straight surfaces, with the fillets formed on the plural buckets and the fillets formed on the plural wheelposts having angles of 59 degrees (column 2, lines 59-61), or 54 degrees (the table in column 3, examples 7 and 8). Note broach slots 17 provided on the wheel, each having an interleaved system of unnumbered fillets and tangs (corresponding to the fillets 32 of the blade roots 18 and tangs 22 of the blade roots 18), with the plural buckets each having the corresponding interleaved system of fillets 32 and tangs 22 so that the plural buckets can be fitted, one to one, into the plural broach slots on the wheel, with the interleaved system of fillets and tangs on the buckets and wheelposts inherently acting to reduce stresses acting on the fitted buckets and wheelposts (due to the firtree shape), the fillets and tangs of the interleaved system of fillets and tangs each being formed by a combination of curved and straight surfaces, with the fillets formed on the plural wheelposts having angles of 59 degrees (column 2, lines 59-61), or 54 degrees (the table in column 3, examples 7 and 8).

Although the buckets and wheelposts have either five interleaved tangs and fillets (column 2, lines 31-33) or seven interleaved tangs and fillets (the table in column 3, examples 7 and 8), the buckets and wheelposts meet the limitation of having three interleaved tangs and fillets. As seen in figure 2, each of the buckets has a bottommost tang formed from unnumbered curved surfaces having more than one radius of curvature (at the bottom of the tang and the top of the tang). As seen in figure 3, each buckets has straight surfaces 29, 30. As seen in figure 2, each of the wheelposts has an unnumbered bottom fillet near 35 formed from curved surfaces having more than one radius of curvature (at the bottom and at the top). Each wheelpost includes unnumbered straight surfaces corresponding to the straight surfaces 29, 30 of the buckets.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3 and 5, as far as they are definite and understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Melenchuk 3,575,522. Melenchuk discloses a turbine comprising a wheel 23 having broach slots 37 with the wheel material between each adjacent pair of slots forming unnumbered wheelposts, each one having an interleaved system of unnumbered fillets and unnumbered tangs shown generally in figure 3, buckets 38 each having a corresponding interleaved system of unnumbered fillets and unnumbered tangs so that the buckets can be fitted one to one into the broach slots on the wheel, with the interleaved system of

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fillets and tangs on the buckets and wheelposts inherently acting to reduce stresses acting on the fitted buckets and wheelposts, due to the fir-tree shape. Each one of the buckets and wheelposts has three interleaved tangs and fillets. As seen in figure 3, each bucket has a bottom tang formed from curved surfaces having more than one radius of curvature (at the bottom of the tang and the top of the tang). As seen in figure 3, each of the wheelposts has an unnumbered bottom fillet formed from curved surfaces having more than one radius of curvature (at the bottom and at the top).

However, Melenchuk does not disclose that there are ninety broach slots and ninety buckets. Rather, there are one hundred two broach slots and buckets (column 3, lines 30-35).

The number of the broach slots and buckets being ninety is deemed to be a matter of choice in design. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to reduce the number of broach slots and buckets in the turbine of Melenchuk to a smaller number, such as ninety, for the purposes of reducing the rotating weight of the turbine, and adjusting the output of the turbine for differing applications.

Claims 4 and 6, as far as they are definite and understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Melenchuk 3,575,522 as applied to claims 3 and 5, respectively above, and further in view of Johnson 5,147,180. The modified turbine of Melenchuk shows all of the claimed subject matter, except for each of the buckets having at least

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one straight surface (claim 4), and except for each of the wheelposts having at least one straight surface (claim 6).

Johnson shows a turbine blade 10 having unnumbered buckets, with the buckets having straight surfaces 28b, 30b, which mate with corresponding unnumbered straight surfaces in unnumbered wheelposts shown in figure 2, for the purpose of minimizing peak blade root and groove stresses.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified turbine of Melenchuk such that the buckets have at least one straight surface, and such that the wheelposts have at least one straight surface, as taught by Johnson, for the purpose of minimizing peak blade root and groove stresses.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Melenchuk 3,575,522 as applied to claims 3 and 5 above. The modified turbine of Melenchuk shows all of the claimed subject matter except for the bucket bottom tang having radii of curvatures of .1992 inches and .3360 inches (claim 7), and except for the wheelpost bottom fillet having radii of curvatures of .2052 inches and 0.3420 inches (claim 8).

The recitation of the curved surfaces of the bucket bottom tang having radii of curvatures of .1992 inches and .3360 inches, and the recitation of the wheelpost bottom fillet having radii of curvatures of .2052 inches and 0.3420 inches are deemed to be matters of choice in design. The

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radii of curvature of curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet are known in the art to be result-effective variables which, when optimized, reduce the stresses in the blade roots and the grooves. It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to select the radii of curvature of the curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet to be specific values, such as .1992 inches and .3360 inches for the bucket bottom tang, and such as .2052 inches and 0.3420 inches for the wheelpost bottom fillet, for the purpose of reducing the stresses in the blade roots and the grooves, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 9, as far as it is definite and understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Melenchuk 3,575,522 as applied to claim 1 above, and further in view of Caruso 6,030,178. The modified turbine of Melenchuk shows all of the claimed subject matter, including unnumbered wheelposts, but does not show that the outer tang edge of each wheelpost is scalloped so as to reduce the weight of the turbine wheel.

Caruso (figure 1) shows a turbine wheel 10 having wheelposts shown generally at 12, which are formed such that an unnumbered outer tang edge of each wheelpost is scalloped, for the inherent purpose of reducing weight of the turbine wheel.

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It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified turbine of Melenchuk such that the outer tang edge of each wheelpost is scalloped, as taught by Caruso, for the purpose of reducing weight of the turbine wheel.

Claims 14-19, 22-24, 26-27, and 31-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 677,142 in view of Johnson 5,147,180. United Kingdom Patent 677,142 discloses a turbine substantially as claimed as set forth above, with the buckets including straight surfaces, and the wheelposts including straight surfaces, but does not disclose the buckets having a bottom tang formed from curved surfaces having more than one radius of curvature (claims 14 and 22), does not disclose the wheelposts having a bottom fillet formed from curved surfaces having more than one radius of curvature (claims 16 and 24), does not disclose the curved surfaces of the bucket bottom tang having radii of curvatures of .1992 inches and .3360 inches (claims 18 and 33), does not disclose the curved surfaces of the bucket bottom tang having radii of curvatures of .1492 inches and .3360 inches (claim 26), does not disclose the wheelpost bottom fillet having radii of curvatures of .2052 inches and 0.3420 inches (claims 19 and 27), does not disclose the bucket having a bottom tang formed from curved surfaces having more than one radius of curvature (claim 31), does not disclose the bucket having an upper tang formed from curved surfaces having more than one radius of curvature (claims 34-35), and does not disclose the bucket having an intermediate tang formed from curved surfaces having more than one radius of curvature (claims 37-39).

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Johnson shows a turbine blade 10 having unnumbered buckets, with the buckets having a bottom tang 32 formed from curved surfaces having more than one radius of curvature R11, R12, with wheelposts (see figure 2) having a bottom fillet formed from curved surfaces having more than one radius of curvature that complement the radius of curvature R11, R12, and with an upper tang 28 formed from curved surfaces having more than one radius of curvature R3, R4, and with an intermediate tang 30 formed from curved surfaces having more than one radius of curvature R7, R8, for the purpose of minimizing peak blade root and groove stresses.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of United Kingdom Patent 677,142 such that the buckets have the bottom tang formed from curved surfaces having more than one radius of curvature, such that the wheelposts have the bottom fillet formed from curved surfaces having more than one radius of curvature, such that the upper tang is formed from curved surfaces having more than one radius of curvature, and such that the intermediate tang is formed from curved surfaces having more than one radius of curvature, as taught by Johnson, for the purpose of minimizing peak blade root and groove stresses.

The recitation of the curved surfaces of the bucket bottom tang having radii of curvatures of .1992 inches and .3360 inches, the recitation of the curved surfaces of the bucket bottom tang having radii of curvatures of .1492 inches and .3360 inches, and the recitation of the wheelpost bottom fillet having radii of curvatures of .2052 inches and 0.3420 inches are deemed to be matters of choice in design. The radii of curvature of curved surfaces of the bucket bottom tang

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and of the wheelpost bottom fillet are recognized by Johnson to be result-effective variables which, when optimized, reduce the stresses in the blade roots and the grooves. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to select the radii of curvature of the curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet to be specific values, such as .1992 inches and .3360 inches for the bucket bottom tang, such as .1492 inches and .3360 inches for the bucket bottom tang, and such as .2052 inches and 0.3420 inches for the wheelpost bottom fillet, for the purpose of reducing the stresses in the blade roots and the grooves, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 18-19, 26-27, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodwin 4,260,331. Goodwin discloses a turbine substantially as claimed as set forth above, but does not disclose the curved surfaces of the bucket bottom tang having radii of curvatures of .1992 inches and .3360 inches (claims 18 and 33), does not disclose the curved surfaces of the bucket bottom tang having radii of curvatures of .1492 inches and .3360 inches (claim 26), and does not disclose the wheelpost bottom fillet having radii of curvatures of .2052 inches and 0.3420 inches (claims 19 and 27).

The recitation of the curved surfaces of the bucket bottom tang having radii of curvatures of .1992 inches and .3360 inches, the recitation of the curved surfaces of the bucket bottom tang having radii of curvatures of .1492 inches and .3360 inches, and the recitation of the wheelpost

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bottom fillet having radii of curvatures of .2052 inches and 0.3420 inches are deemed to be matters of choice in design. The radii of curvature of curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet are known in the art to be result-effective variables which, when optimized, reduce the stresses in the blade roots and the grooves. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to select the radii of curvature of the curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet to be specific values, such as .1992 inches and .3360 inches for the bucket bottom tang, such as .1492 inches and .3360 inches for the bucket bottom tang, and such as .2052 inches and 0.3420 inches for the wheelpost bottom fillet, for the purpose of reducing the stresses in the blade roots and the grooves, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 20 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 677,142 in view of Caruso 6,030,178. The United Kingdom Patent 677,142 discloses a turbine substantially as claimed as set forth above, including unnumbered wheelposts, but does not disclose that the outer tang edge of each wheelpost is scalloped so as to reduce the weight of the turbine wheel.

Caruso (figure 1) shows a turbine wheel 10 having wheelposts shown generally at 12, which are formed such that an unnumbered outer tang edge of each wheelpost is scalloped, for the inherent purpose of reducing weight of the turbine wheel.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of United Kingdom Patent 677,142 such that the outer tang edge of each wheelpost is scalloped, as taught by Caruso, for the purpose of reducing weight of the turbine wheel.

Double Patenting

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claims 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 28, 29, 30, 31, 32, 34, 35, 36, 37, 38, 39, and 40 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 28, 29, 30, 31, 32, 34, 35, 36, 37, 38, 39, and 40 of copending Application No. 10/774,400. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented. Independent claim 10 of the copending application 10/774,400 recites that the fillets formed on the plural buckets have angles ranging from 50 to 57 degrees, independent claim 11 of the copending application 10/774,400 recites that the fillets formed on the plural wheelposts have angles ranging from 50 to 57 degrees, and independent claim 29 of the copending application

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10/774,400 recites that the angles of the fillets formed in the bucket range from 50 to 57 degrees. Independent claim 10 of the instant application recites that the fillets formed on the plural buckets have angles ranging from 50 to 59 degrees, independent claim 11 of the instant application recites that the fillets formed on the plural wheelposts have angles ranging from 50 to 59 degrees, and independent claim 29 of the instant application recites that the angles of the fillets formed in the bucket range from 50 to 59 degrees. All of the corresponding claims in both applications are otherwise verbatim, with claim 10 of the copending application claiming broach slots, which are the same as the wheelposts claimed in claim 10 of the instant application. Because the claimed range of 50 to 59 degrees in the instant application falls within the claimed range of 50 to 57 degrees in the copending application 10/774,400, the claims conflict and are therefore considered to claim the same invention as recited in the claims of copending application 10/774,400.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Leonardi and Heinig are cited to show turbine rotor blades having fillets and tangs with different radii of curvature.

Hill is cited to show a turbine with sixty buckets and broach slots.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
June 10, 2005


Christopher Verdier
Primary Examiner
Art Unit 3745